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AGRICULTURAL RESEARCH SERVICE, U. S. DEPARTMENT OF AGRICULTURE

Dairy-Herd-Improvement Letter

ARS-44-147
(Vol. 40, No. 5)

June 1964

RÉSUMÉ OF 1963-64

Genetic Appraisal of Sires

As planned (ARS-44-131), quarterly sire evaluations were made during fiscal year 1964. These genetic appraisals were based on 16,959 non-AI and 5,454 AI sire evaluations. Collectively, they resulted in 66,383 individual sire records (DHIA-1202's) for the cooperating States and were based on 1,911,102 lactation records reported since the last evaluation in 1962-63. A further summary of the quarterly sire evaluation is shown in table 1.

Genetic Appraisal of Cows

The initial DHIA Cow Index List (ARS-44-139) was produced in April 1964 and the second (ARS-44-146) in June. These indexing procedures are used to evaluate and recognize genetically superior cows. The cows and levels represented in the two lists which represent 10,147 evaluations after screening approximately 500,000 potential qualifiers are as follows:

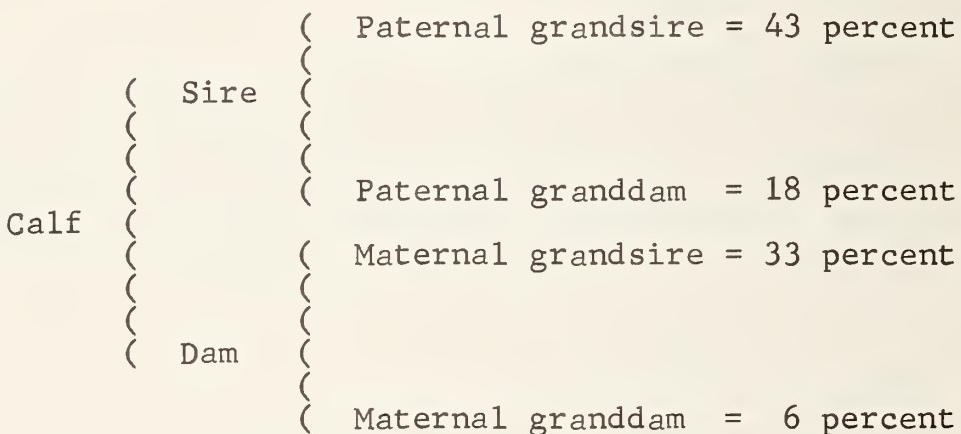
Breed	Minimum Level 1/ Milk Lbs.	Cow Indexes	
		ARS-44-139 No.	ARS-44-146 No.
Ayrshire	1,995	72	97
Guernsey	1,312	408	586
Holstein	1,711	2,392	5,409
Jersey	1,189	386	512
Brown Swiss	1,586	127	151
Milking Shorthorn	1,350	2	5
Total		3,387	6,760

1/ Index equated to genetic superiority over herdmates. The average index value of all cows was in excess of 2,000 pounds of milk.

Issued July 1964

Great potential can be realized in selectively mating genetically superior cows and sires. For example, a thoroughly tested and AI-evaluated sire with a predicted average in excess of the breed average by 1,000 pounds of milk has an estimated breeding value of +2,000 since he is presumed to have been mated to average cows. The mating of this bull to a cow indexed at +2,000 should yield offspring of similar levels of breeding values.

Robertson and Rendel of 1950* estimated that under strictly AI conditions, genetic improvement in the amount of 1.69 percent per year is possible. The values assigned to each grandparent and expressed as a sum of 100 percent are as follows:



Thus, in terms of potential under AI-tested conditions, the parents of the dam of a calf are valued at 39 percent ($33 + 6$). These estimates, along with rates of genetic progress, will vary according to the amount of production testing involved and with the intensity of selection in the choice of sires and dams.

The DHIA Cow Index can and should be a very useful tool in assisting the industry to further advance genetic progress in the Nation's dairy herds. The indexing method, which considers both the cow (her performance vs. herdmates) and her AI sire (her paternal half-sisters vs. their herdmates), complements the DHIA sire summary evaluations.

* Robertson, A., and Rendel, J. M. 1950. The use of progeny testing with artificial insemination in dairy cattle. J. Genetics, 50:21-31.

Herd and Cow Production Levels

The 2,006,534 Standard DHIA cows in 1962-63 averaged 11,286 pounds of milk and 434 pounds of fat. This represented an increase of 254 pounds of milk per cow per year over the previous year's average, and a superiority of more than 2 tons of milk per cow over that of non-tested cows. The production of Owner-Sampler cows was initially reported (ARS-44-141) and averaged 10,606 pounds of milk and 396 pounds of fat. These production values are on a cow-year average basis.

Participation in DHIA Recordkeeping Plans

On January 1, 1964, the combined DHIA recordkeeping program totaled 2,822,522 cows and 67,664 herds. This represents 17.1 percent of the Nation's dairy cow population (as opposed to 16.3 percent in 1963) and represents an increase of 39,018 cows over the previous year.

2,554 SIRES SUMMARIZED IN MAY 1964

A total of 1,508 non-AI and 1,046 AI sires were evaluated in May 1964. Included in the evaluation were 286,235 lactation records received and processed since the previous summary. Tables 2, 3, and 4 further summarize the results of the evaluation.

SEASONAL VARIATIONS IN U.S. DHIA AVERAGES

Breed-season lactation averages for cows that calved in 1962 are shown in table 5. The average of all available 1,095,604 lactation records, 54 percent of which represent grade cows, was 11,953 pounds of milk and 459 pounds of fat. Within the calendar year, calvings in October through March resulted in superiority of lactation milk yield in the amount of 573, 521, 557, 430, 619, and 385 pounds for Ayrshire, Guernsey, Holstein, Jersey, Brown Swiss, and Milking Shorthorn cows, respectively. The highest lactation average for percent of butterfat test was noted among cows calving from January through June. The lowest three months in lactation average milk yield were for calvings in June, July, and August. These seasons of calving relationships with production performance are generally consistent with previously reported research results.

Table 1.--Sire summaries in 1963-64

Evaluation	Sires	AI No.	Progeny No.	Sires	Non-AI No.	Progeny No.	Summaries to States No.	Additional records added since last run No.
	No.		No.	No.	No.	No.		
July 1963	1,284	183	986	5,227	61,364	16,718	597,597	
November 1963	913	155	278	3,076	25,759	10,169	542,889	
March 1964	2,211	591	577	7,148	110,610	30,312	484,381	
May 1964	1,046	195	591	1,508	13,965	9,184	286,235	
Overall	5,454	1,126	432	16,959	211,698	66,383	1,911,102	

Table 2.--Performance of AI sires summarized in May 1964, as measured by the production of progeny and their herdmates

Breed	Total No.	Sires			Daughters			Herdmates		
		Milk Yield Maintained or increased Pct.	Fat Yield Maintained or increased Pct.	Daughters with Herdmates No.	Milk Lbs.	Test Pct.	Fat Lbs.	Milk Lbs.	Test Pct.	Fat Lbs.
Ayrshire	34	74	68	3,029	10,560	4.1	428	10,449	4.1	427
Guernsey	199	43	54	19,491	8,947	4.8	431	8,991	4.8	431
Holstein	579	45	52	156,887	13,033	3.7	480	13,213	3.7	483
Jersey	156	46	47	11,616	8,307	5.2	433	8,408	5.2	437
Brown Swiss	59	49	56	4,437	11,327	4.1	464	11,218	4.1	459
Milking Shorthorn	16	50	50	121	9,004	3.8	344	8,852	3.8	334
Red Dane	3	33	33	10	10,380	3.7	384	10,870	3.7	407
Overall	1,046	46	52	195,591	11,305	4.1	459	11,417	4.0	461

Table 3.--Performance of non-AI sires summarized in May 1964, as measured by the production of progeny and their herdmates

Breed	Total No.	Sires			Daughters			Herdmates		
		Milk Yield Maintained or increased Pct.	Fat Yield Maintained or increased Pct.	Daughters with Herdmates No.	Milk Lbs.	Test Pct.	Fat Lbs.	Milk Lbs.	Test Pct.	Fat Lbs.
Ayrshire	41	63	358	10,580	4.1	434	10,329	4.1	421	
Guernsey	271	55	2,655	9,221	4.9	451	9,225	4.8	445	
Holstein	873	49	7,746	13,418	3.7	491	13,425	3.7	491	
Jersey	219	51	2,119	8,376	5.2	438	8,404	5.2	438	
Brown Swiss	81	51	863	11,156	4.1	460	11,077	4.1	450	
Milking Shorthorn	23	61	224	9,189	3.7	342	8,843	3.8	334	
Red Dane	-	-	-	-	-	-	-	-	-	
Overall	1,508	51	52	13,965	11,668	4.0	471	11,661	4.0	469

Table 4.--Number of sire records summarized 05-64, by State, by breed

State	Ayrshire	Guernsey	Holstein	Jersey	Brown Swiss	Shorthorn	Red Dane	Total
	Number	Number	Number	Number	Number	Number	Number	Number
Maine-----	11	20	72	21	7	2		133
New Hampshire-----	19	23	83	22	8	1		156
Vermont-----	17	43	168	68	19			315
Massachusetts-----	22	48	129	34	17			250
Rhode Island-----	5	9	49	10				73
Connecticut-----	16	63	123	29	17			248
New York-----	29	75	426	69	25	3	1	628
New Jersey-----	2	47	124	23	14			210
Pennsylvania-----	21	108	252	49	24	3		457
Ohio-----	12	53	160	66	27	2		320
Indiana-----	5	56	122	33	22	2		240
Illinois-----	16	79	247	37	45	7		431
Michigan-----	5	52	261	44	24	3	3	392
Wisconsin-----	9	95	359	38	46	11		558
Minnesota-----	19	57	239	25	32	10		382
Iowa-----	16	48	213	42	41	12		372
Missouri-----		32	93	27	7	6		165
North Dakota-----	1	10	43	3	9	1		67
South Dakota-----	5	7	68	6	12			98
Nebraska-----	4	21	95	7	14	4		145
Kansas-----	13	32	120	19	16	5		205
Delaware-----	4	15	63	6	6			94
Maryland-----	11	56	173	21	24	1		286
Virginia-----	11	53	161	22	11	1		259
West Virginia-----	8	17	79	18	1			123
North Carolina-----	6	38	125	37	13			219
South Carolina-----	1	33	86	23	11			154
Georgia-----	4	17	86	19	15			141
Florida-----	1	41	36	25	9			112
Kentucky-----		17	94	29	7			147
Tennessee-----	2	45	65	44	14	3		173
Alabama-----	2	26	51	27	6	1		113
Mississippi-----	8	26	23	35	8			100
Arkansas-----	1	16	32	8		3		60
Louisiana-----		26	29	15	4			74
Oklahoma-----	5	12	54	16	8	7		102
Texas-----	6	21	105	33	20			185
Montana-----	7	21	4	5				37
Idaho-----	1	30	71	19	9	3		133
Wyoming-----		1	17					18
Colorado-----	2	19	81	15	13			130
New Mexico-----		9	29	8				46
Arizona-----		21	39	8	3			71
Utah-----	2	18	90	10	2			122
Nevada-----		1	4	6				11
Washington-----	7	34	85	24	3	2		155
Oregon-----	4	42	62	47	7	4		166
California-----	1	27	54	14				96
Puerto Rico-----			6					6
Hawaii-----			1					1
Alaska-----			1		4			5
Total-----	75	472	1,459	377	141	39	3	^{1/} 9,184 ^{2/} 2,566

1/ Represents the number of individual sire records sent to States.

2/ Represents the number of sires summarized.

Table 5.--Breed-season DHIA lactation averages for calvings in 1962

AYRSHIRE

Calving Month	Records		Average Production		
	Registered	Total	Milk	Fat	Lbs.
	Pct.	No.	Lbs.	Pct.	Lbs.
January-----	81	1,823	10,293	4.01	413
February-----	79	1,701	10,401	3.99	415
March-----	79	1,944	10,440	3.98	415
April-----	77	1,333	10,133	3.97	402
May-----	79	1,169	9,967	3.95	394
June-----	78	1,080	9,812	3.97	390
July-----	78	1,883	9,629	4.03	388
August-----	78	2,860	9,809	4.07	399
September-----	78	2,944	9,959	4.09	407
October-----	79	2,619	10,451	4.10	428
November-----	80	2,249	10,550	4.07	429
December-----	78	1,876	10,613	4.05	430
Overall-----	79	23,481	10,179	4.04	411

GUERNSEY

Calving Month	Records		Average Production		
	Registered	Total	Milk	Fat	Lbs.
	Pct.	No.	Lbs.	Pct.	Lbs.
January-----	67	10,999	9,205	4.71	434
February-----	67	9,477	9,227	4.69	433
March-----	67	10,033	9,218	4.69	432
April-----	66	8,053	9,093	4.70	427
May-----	68	7,118	8,813	4.70	414
June-----	66	7,190	8,589	4.72	405
July-----	68	10,227	8,440	4.76	402
August-----	66	13,215	8,424	4.81	405
September-----	64	13,995	8,614	4.83	416
October-----	65	12,874	8,961	4.83	433
November-----	66	12,245	9,209	4.80	442
December-----	66	10,901	9,277	4.74	440
Overall-----	66	126,327	8,916	4.76	424

HOLSTEIN

Calving Month	Records		Average Production		
	Registered	Total	Milk	Fat	Lbs.
	Pct.	No.	Lbs.	Pct.	Lbs.
January-----	41	65,245	13,070	3.63	474
February-----	40	53,501	13,053	3.62	473
March-----	40	56,424	12,986	3.62	470
April-----	38	43,645	12,899	3.61	466
May-----	38	37,798	12,653	3.61	457
June-----	37	40,714	12,429	3.63	451
July-----	38	66,571	12,290	3.65	448
August-----	39	98,681	12,454	3.66	456
September-----	39	107,153	12,770	3.68	470
October-----	39	96,939	13,157	3.69	485
November-----	40	87,621	13,281	3.67	487
December-----	40	77,778	13,288	3.64	484
Overall-----	39	832,070	12,882	3.65	470

JERSEY

Calving Month	Records		Average Production		
	Registered	Total	Milk	Fat	Lbs.
	Pct.	No.	Lbs.	Pct.	Lbs.
January-----	66	7,806	8,636	5.09	440
February-----	64	6,541	8,646	5.08	439
March-----	64	6,533	8,741	5.08	444
April-----	64	5,137	8,592	5.06	435
May-----	62	4,316	8,355	5.04	421
June-----	60	4,185	8,134	5.05	411
July-----	62	6,882	7,913	5.09	403
August-----	61	9,712	7,757	5.14	399
September-----	61	10,299	7,903	5.20	411
October-----	60	9,359	8,203	5.18	425
November-----	61	8,409	8,451	5.16	436
December-----	62	7,838	8,558	5.12	438
Overall-----	62	87,017	8,290	5.13	425

Table 5.--Breed-season DHIA lactation averages for calvings in 1962 (Con't.).

BROWN SWISS

Calving Month	Records		Average Production		
	Registered	Total	Milk	Pct.	Fat
	Pct.	No.	Lbs.		Lbs.
January-----	72	1,949	11,552	4.05	468
February-----	71	1,735	11,477	4.04	464
March-----	73	1,953	11,494	4.04	464
April-----	73	1,647	11,352	4.03	458
May-----	72	1,381	11,055	4.03	445
June-----	70	1,388	10,818	4.04	437
July-----	74	1,923	10,677	4.10	438
August-----	69	2,344	10,636	4.13	439
September-----	68	2,299	10,830	4.14	448
October-----	67	2,168	11,245	4.14	465
November-----	71	2,145	11,530	4.11	474
December-----	71	1,913	11,788	4.08	481
Overall-----	71	22,845	11,201	4.08	457

MILKING SHORTHORN

Calving Month	Records		Average Production		
	Registered	Total	Milk	Pct.	Fat
	Pct.	No.	Lbs.		Lbs.
January-----	84	300	9,094	3.82	347
February-----	80	251	9,069	3.80	345
March-----	84	308	9,303	3.79	353
April-----	82	227	9,186	3.71	341
May-----	81	188	8,930	3.72	332
June-----	79	168	8,792	3.75	330
July-----	88	307	8,537	3.80	324
August-----	86	384	8,133	3.75	305
September-----	83	403	8,583	3.82	328
October-----	82	383	8,922	3.84	343
November-----	85	324	9,030	3.82	345
December-----	81	303	9,051	3.83	347
Overall-----	83	3,546	8,855	3.79	336

RED DANE

Calving Month	Records		Average Production		
	Registered	Total	Milk	Pct.	Fat
	Pct.	No.	Lbs.		Lbs.
January-----	0	15	11,734	3.84	450
February-----	0	12	12,613	3.97	501
March-----	0	21	10,757	4.07	438
April-----	0	12	10,696	3.92	419
May-----	0	14	9,681	4.17	404
June-----	0	8	10,435	3.97	414
July-----	0	14	9,954	3.83	381
August-----	0	31	10,703	4.06	435
September-----	0	30	10,242	4.07	417
October-----	0	13	10,884	3.94	429
November-----	0	20	11,457	3.82	438
December-----	0	9	11,622	3.91	454
Overall-----	0	199	10,825	3.98	431

RED POLL

Calving Month	Records		Average Production		
	Registered	Total	Milk	Pct.	Fat
	Pct.	No.	Lbs.		Lbs.
January-----		17	8,183	3.91	320
February-----	91	11	6,499	4.05	263
March-----	73	11	8,233	4.12	339
April-----	60	10	7,826	4.00	313
May-----	67	3	7,080	4.28	303
June-----	78	9	6,332	3.90	247
July-----	43	7	6,273	4.16	261
August-----	100	5	9,128	4.17	381
September-----	56	9	9,000	4.10	369
October-----	85	13	6,437	4.05	261
November-----	93	14	7,541	4.03	304
December-----	90	10	7,535	4.13	311
Overall-----	81	119	7,503	4.05	304
United States--	46	1,095,604	11,953	3.84	459

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